Cascade Fire (2012) documentation

U.S. Department of the Interior
National Park Service

Yosemite National Park
Division of Resources Management and Science

- Assessment and spread modeling
- Emissions
- Impacts
- Context

2012 context: Fire, Fire, Everywhere

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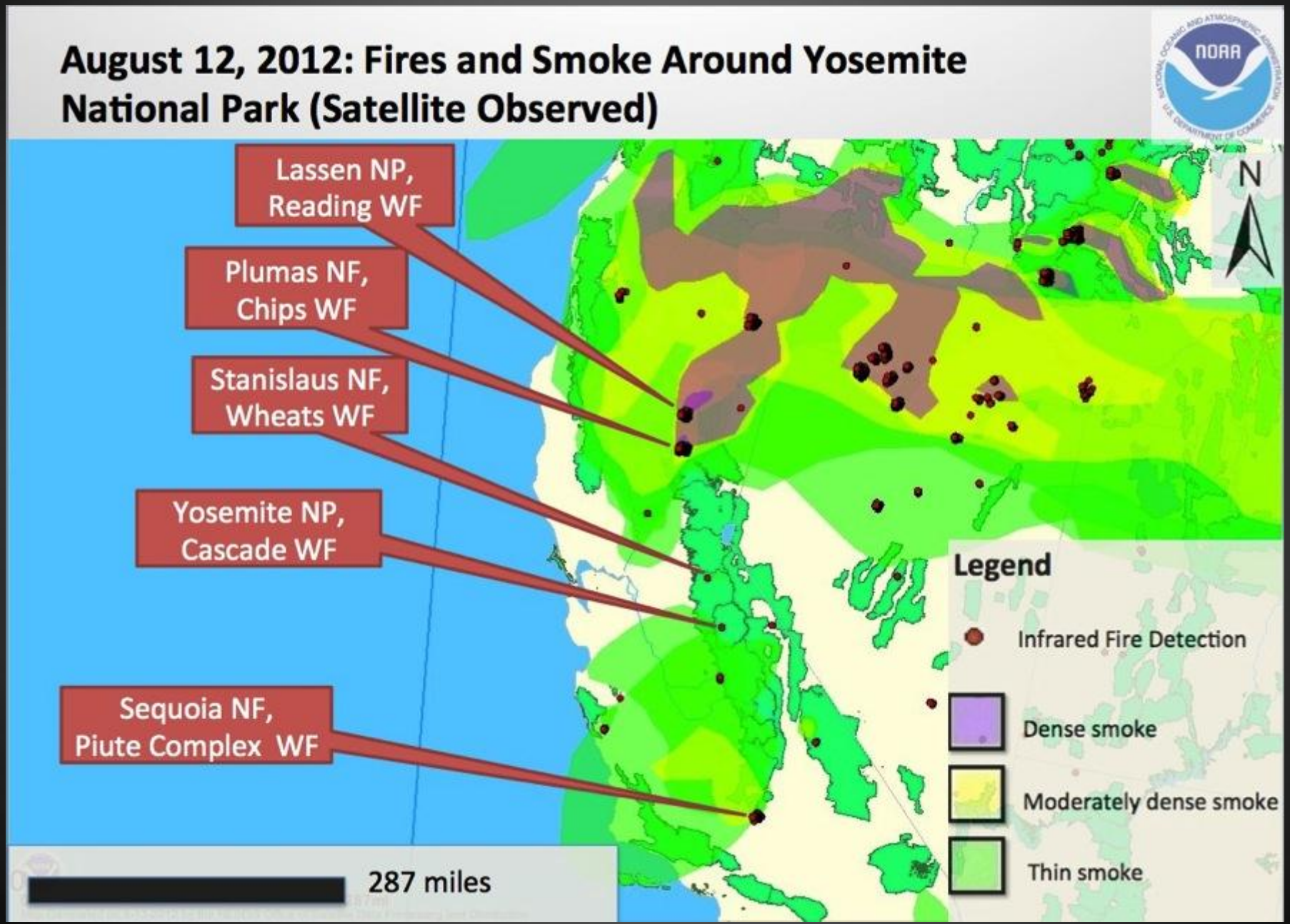

The Cascade Fire

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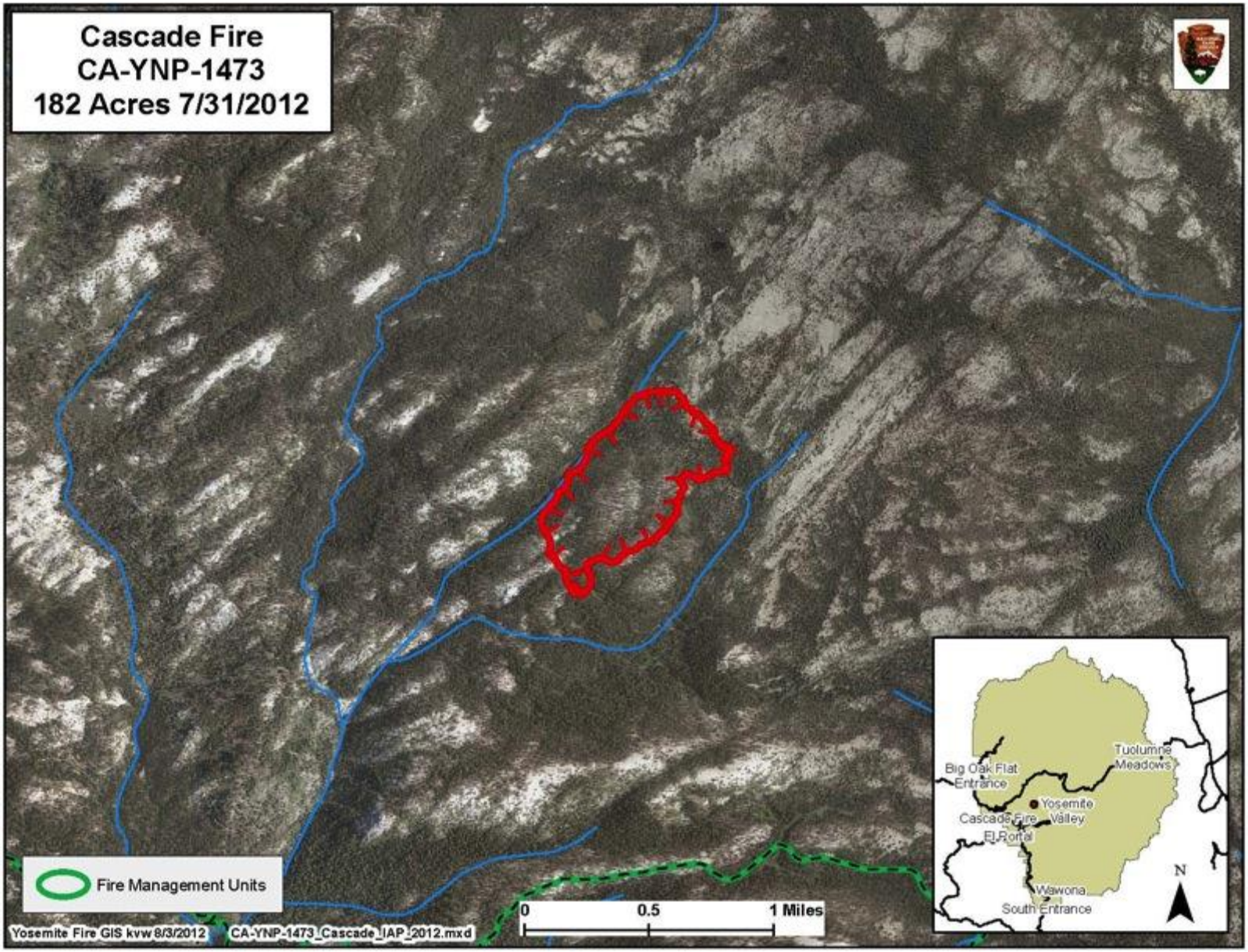

Assessment: Likely Fire spread

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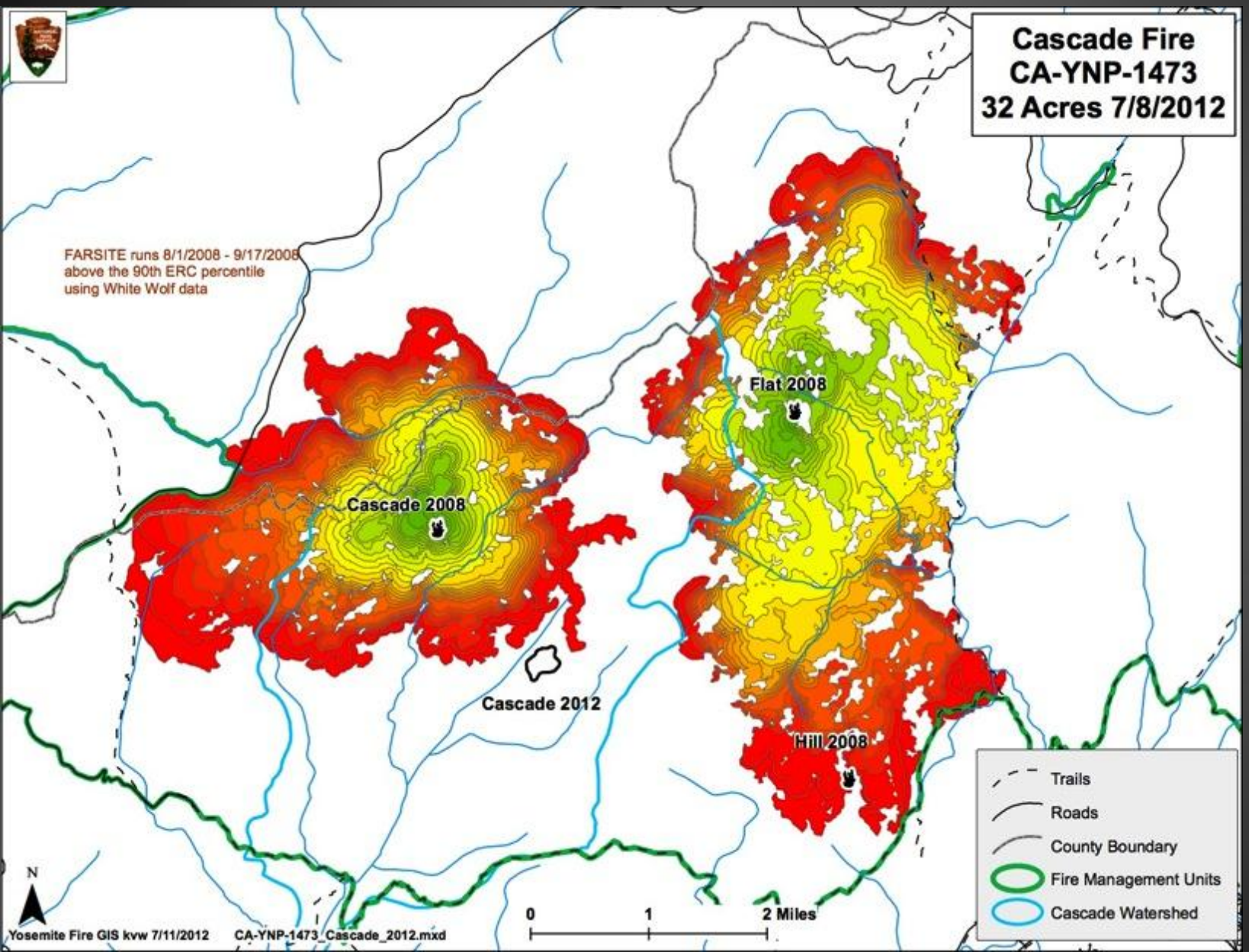

Historic fires and projected growth

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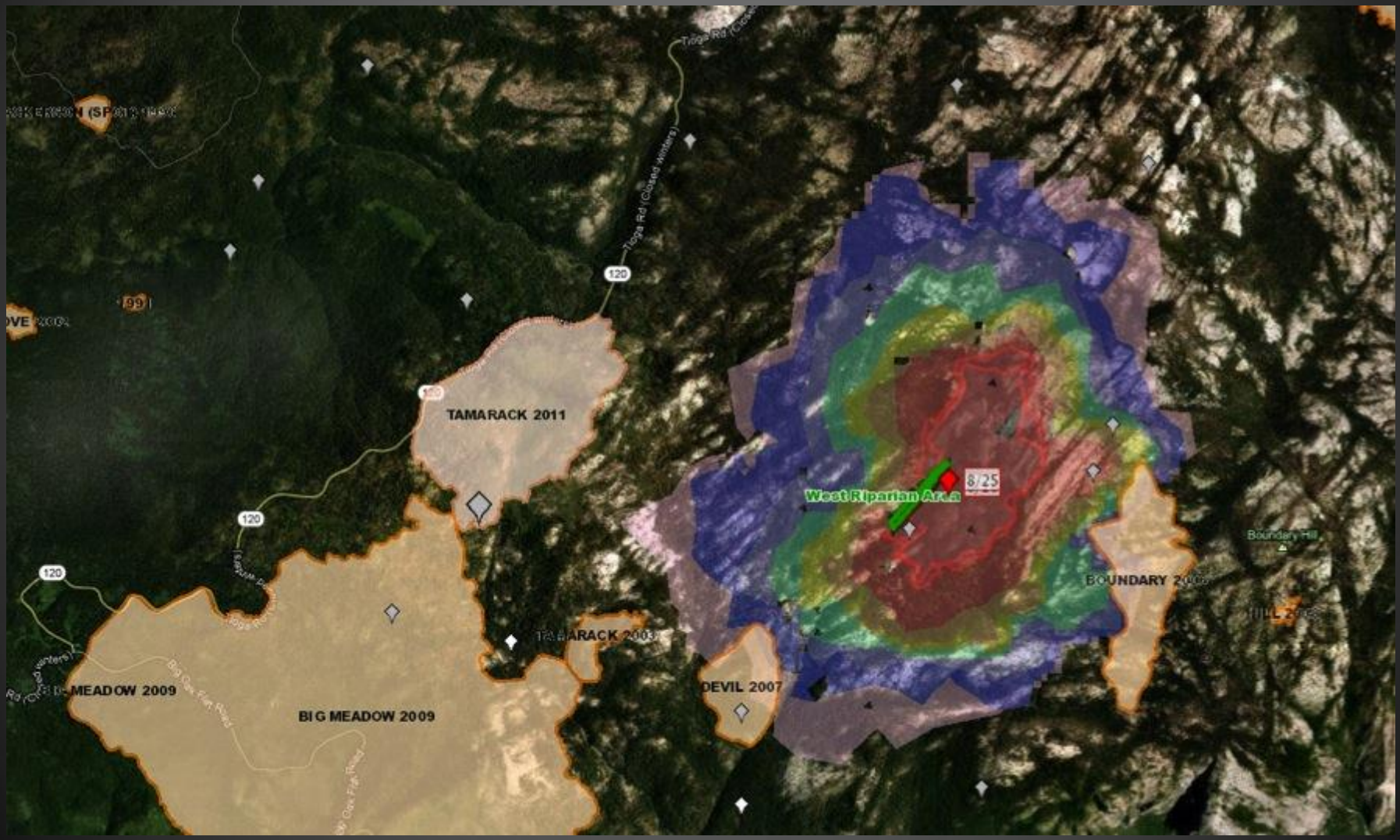

Permitting and Air District Collaboration

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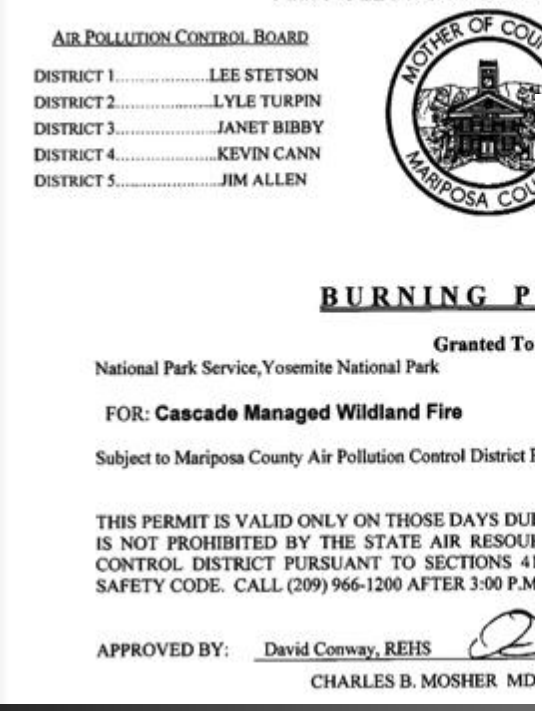

AIR POLLUTION CONTROL DISTRICT

AIR POLLUTION CONTROL BOARD

DISTRICT 1.....LEE STETSON
DISTRICT 2.....LYLE TURPIN
DISTRICT 3.....JANET BIBBY
DISTRICT 4.....KEVIN CANN
DISTRICT 5.....JIM ALLEN

CHARLES B. MOSHER, MD, MPH
AIR POLLUTION CONTROL OFFICER
5100 Bullion Street

BURNING P

Granted To
National Park Service, Yosemite National Park

FOR: **Cascade Managed Wildland Fire**

Subject to Mariposa County Air Pollution Control District

THIS PERMIT IS VALID ONLY ON THOSE DAYS DU
IS NOT PROHIBITED BY THE STATE AIR RESOU
CONTROL DISTRICT PURSUANT TO SECTIONS 4
SAFETY CODE. CALL (209) 966-1200 AFTER 3:00 P.M

APPROVED BY: David Conway, REHS

CHARLES B. MOSHER MD

10) Participate daily in the 1:00 pm conference call with updates on All active Fire activity. The 1:00pm call will also be used to assist in predicting up coming meteorological changes that may affect smoke impacts.

11) 3-5 Satguard monitoring stations to be set-up and maintained by Yosemite Resource Staff in locations agreed upon by resource staff and MCAPCD staff.

12) In order to help prevent unhealthy smoke impacts, when any monitor shows the 24 hour average concentration of PM2.5 to be equal to or exceeding 30 micrograms per meter cubed for two consecutive days, or the 3 hour average equals or exceeds 75 micrograms per meter cubed for any four hour period over three consecutive days, or if visibility is reduced to less than 5 miles in an unmonitored smoke sensitive area, reasonable modifications of operational strategies will be implemented to help prevent further smoke impacts. MCAPCD will be contacted to discuss these strategy changes.

13) When any monitor shows the 24 hour average concentration of PM to be equal to or exceeding 65 micrograms per meter cubed,or visibility in unmonitored smoke sensitive areas has been reduced to less than 5 miles for two consecutive days smoke impacts will be declared a high priority to protect public health and safety and all feasible measures will be taken to reduce smoke impacts. Agency and MCAPCD will work together when determining the feasibility of specific strategies.

14) Forecasted meteorology will be a major consideration for any actions precipitated by the trigger points identified in conditions 12 and 13. Preventing and/or reducing Public Health impacts due to smoke by matching emissions to dispersion is the overall goal.

Projected vs. Actual Growth

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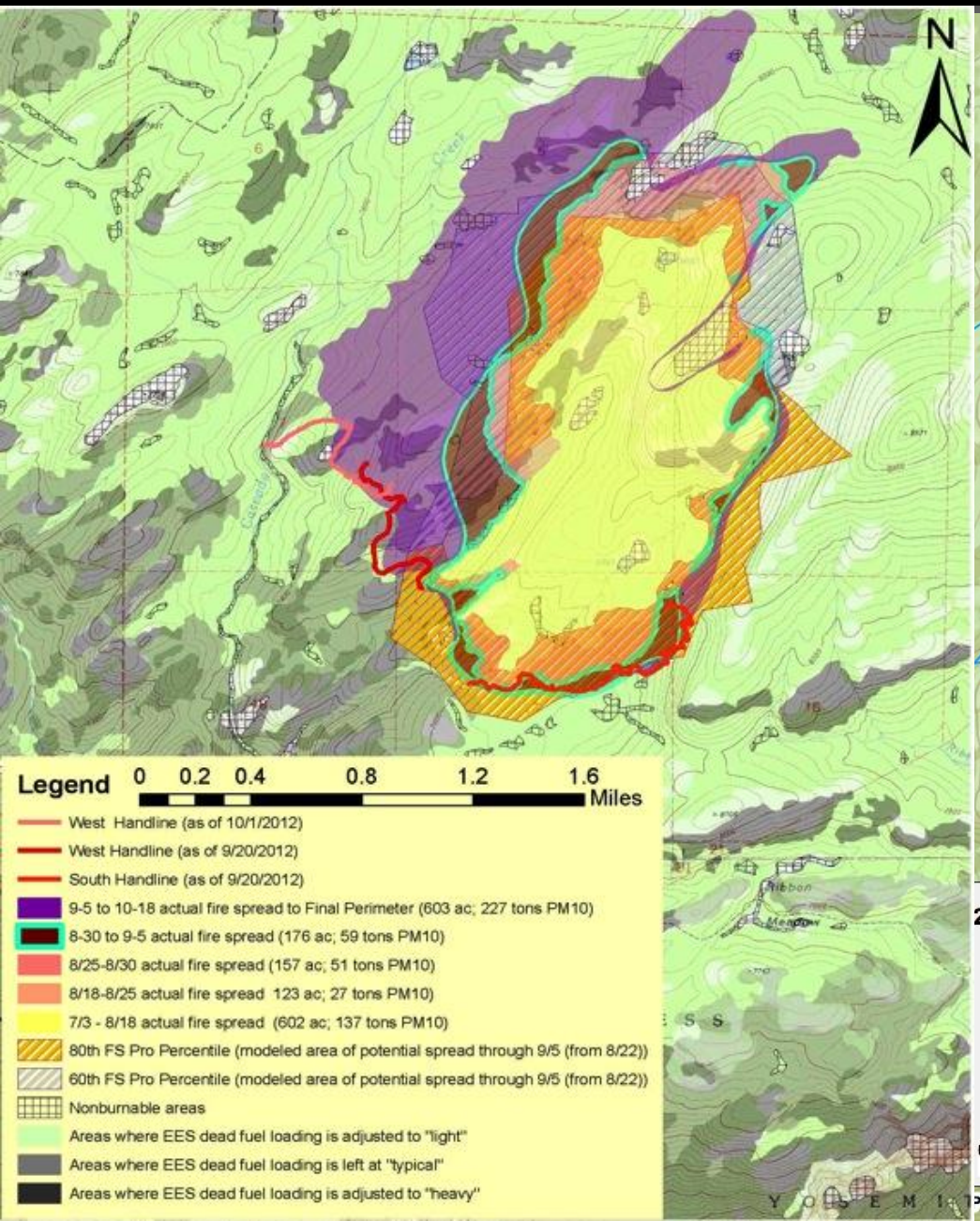

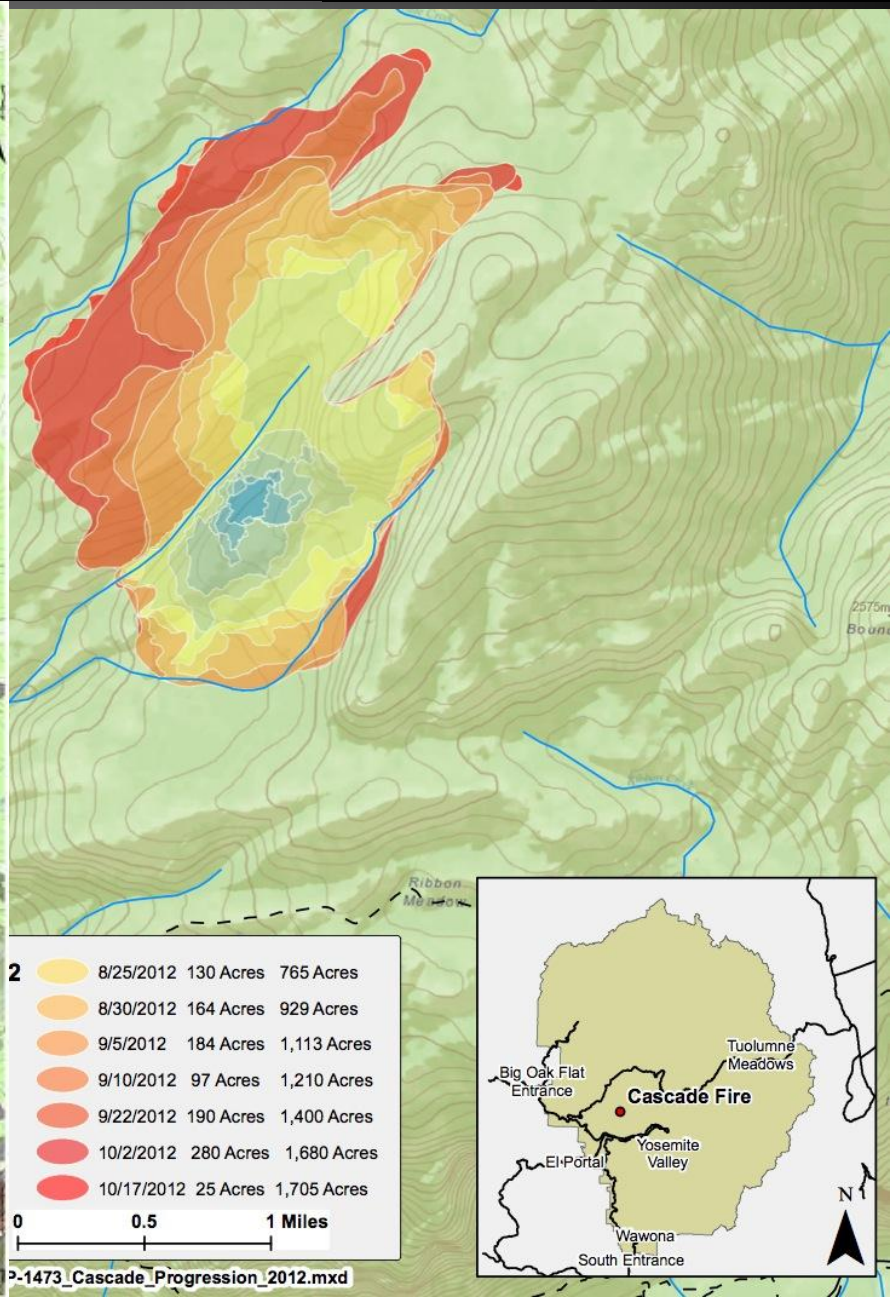

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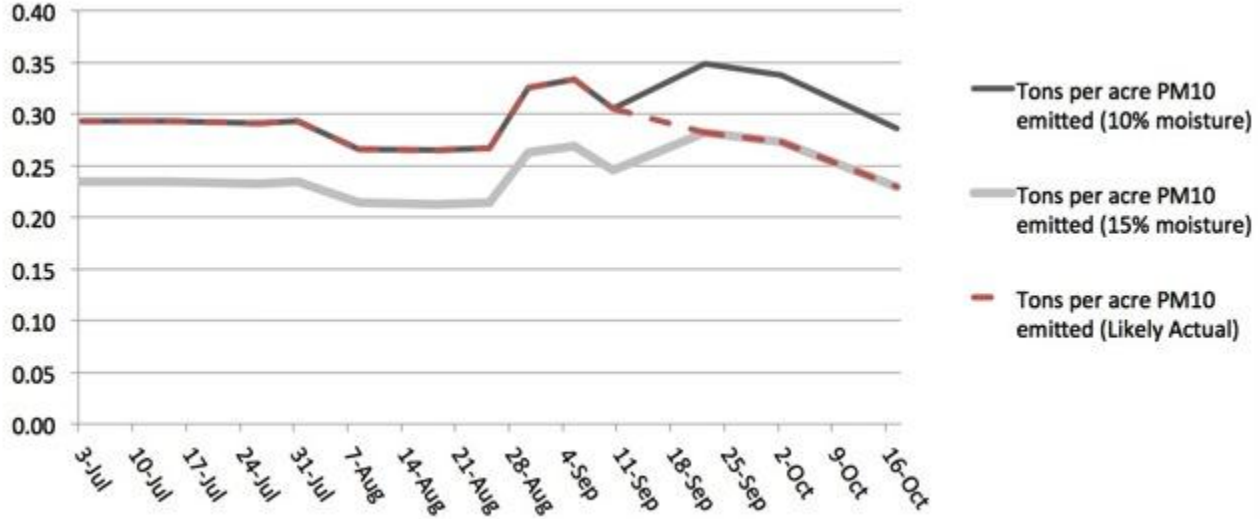
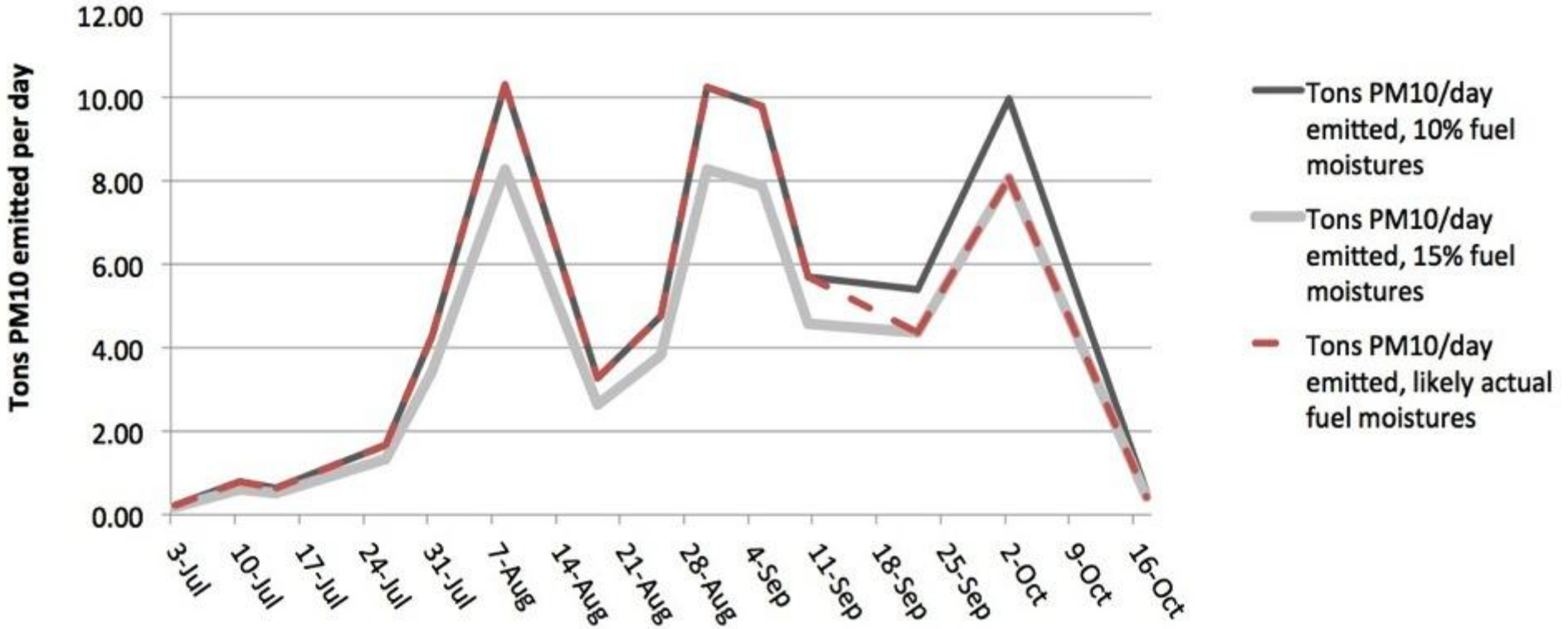
Emissions





Remote Sensing

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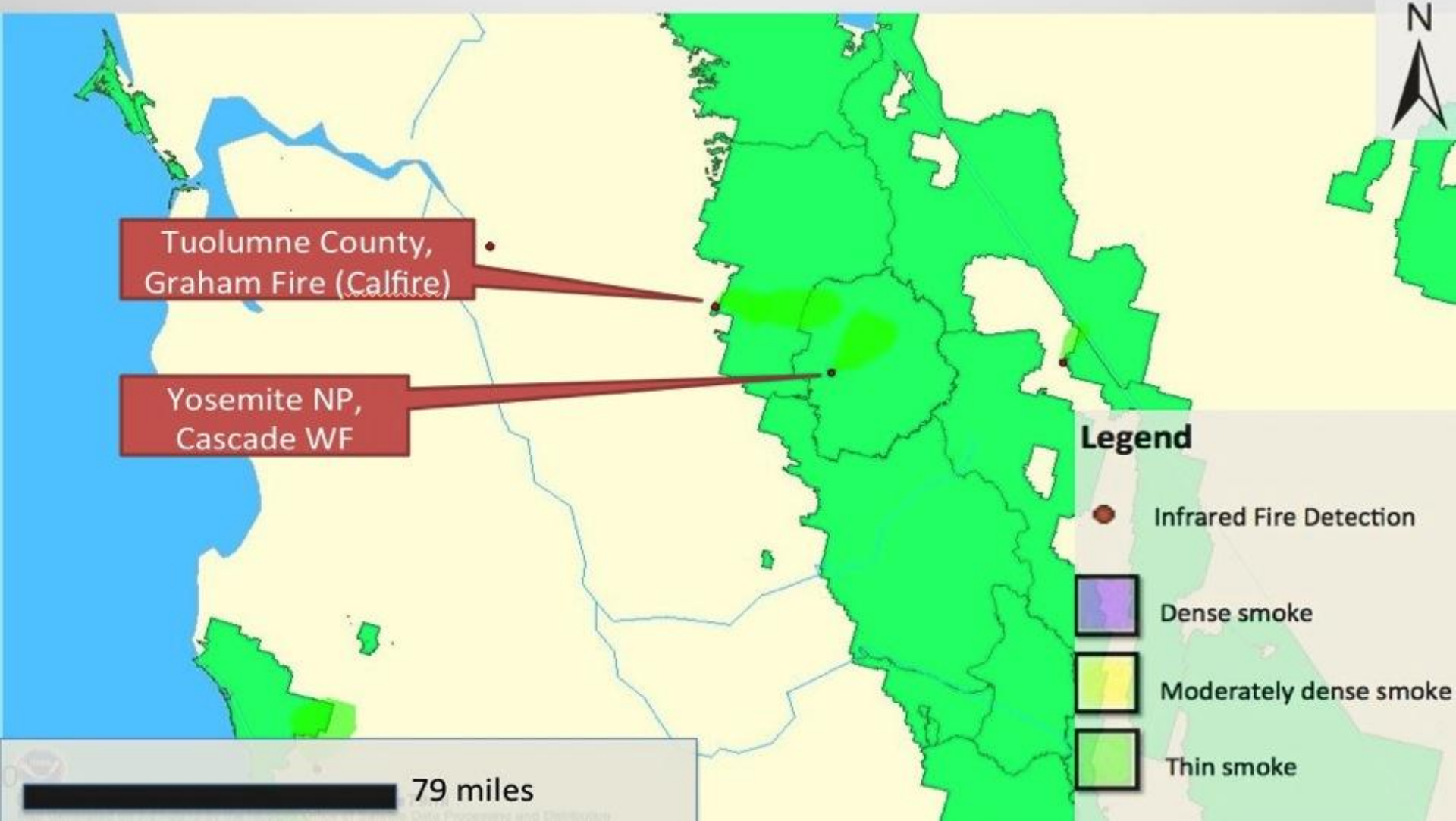
July 26, 2012: Fires and Smoke Around Yosemite National Park (Satellite Observed)



The Monitoring Swarm

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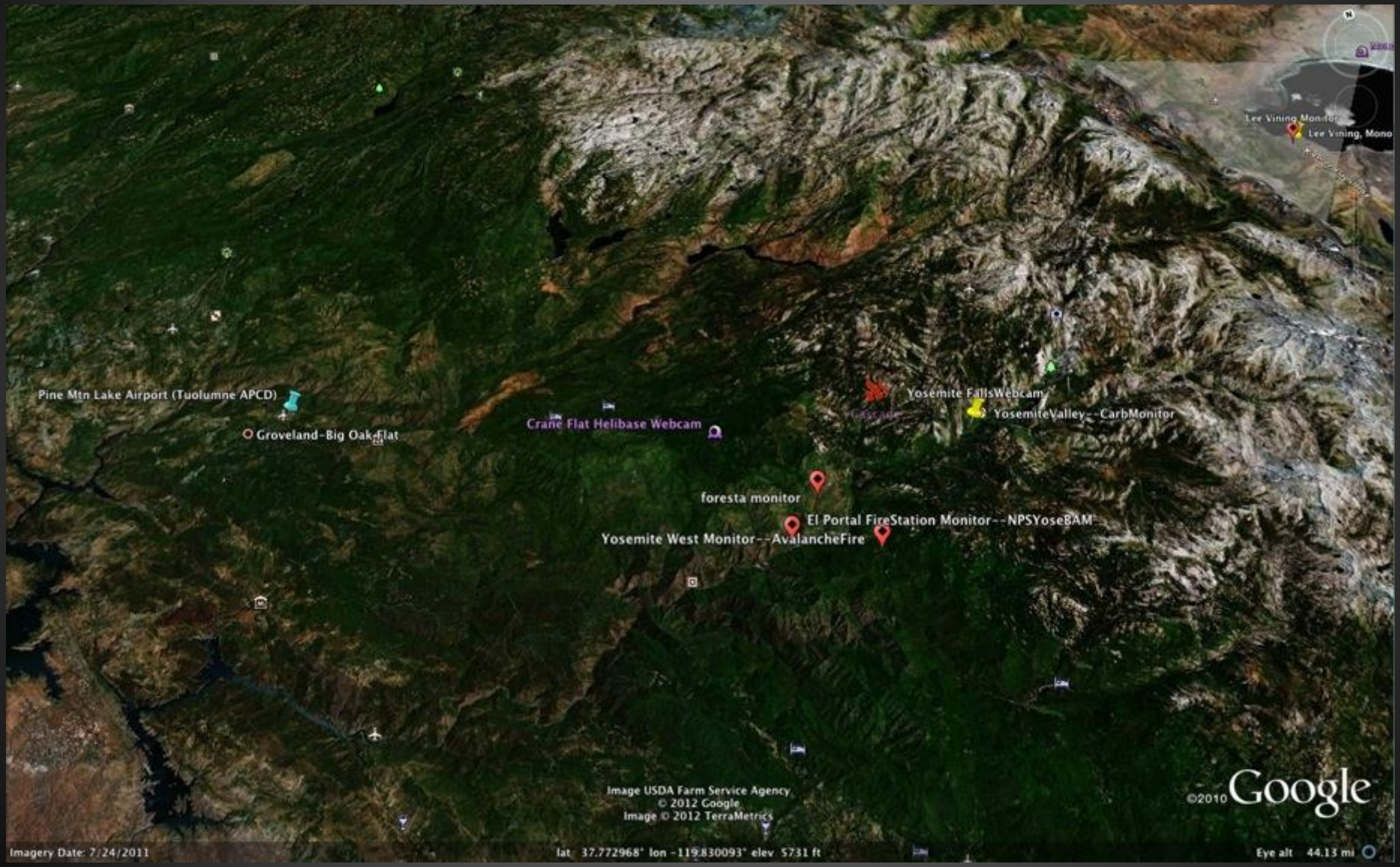

Metadata's role in documenting impacts

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- Where? Site
- When? (Datetime)
- Why? (Fire)
- How? (Instrument)
  - 1 file/monitor

	A	B	C	D
1	Datetime	Fire	Site	Origil.Notes
2	11/15/12 16:00	Test	Site Test	TBA
3	11/15/12 17:00	Test	Site Test	TBA
4	11/15/12 19:00	Test	Site Test	TBA
5	11/15/12 20:00	Test	Site Test	TBA
6	11/15/12 21:00	Test	Site Test	TBA
7	11/15/12 22:00	Test	Site Test	TBA
8	11/15/12 23:00	Test	Site Test	TBA
9	11/16/12 0:00	Test	Site Test	TBA
10	11/16/12 1:00	Test	Site Test	TBA
11	11/16/12 2:00	Test	Site Test	TBA
12	11/16/12 3:00	Test	Site Test	TBA
13	11/16/12 4:00	Test	Site Test	TBA
14	11/16/12 5:00	Test	Site Test	TBA
15	11/16/12 6:00	Test	Site Test	TBA

AQ Impacts, using metadata (Health)

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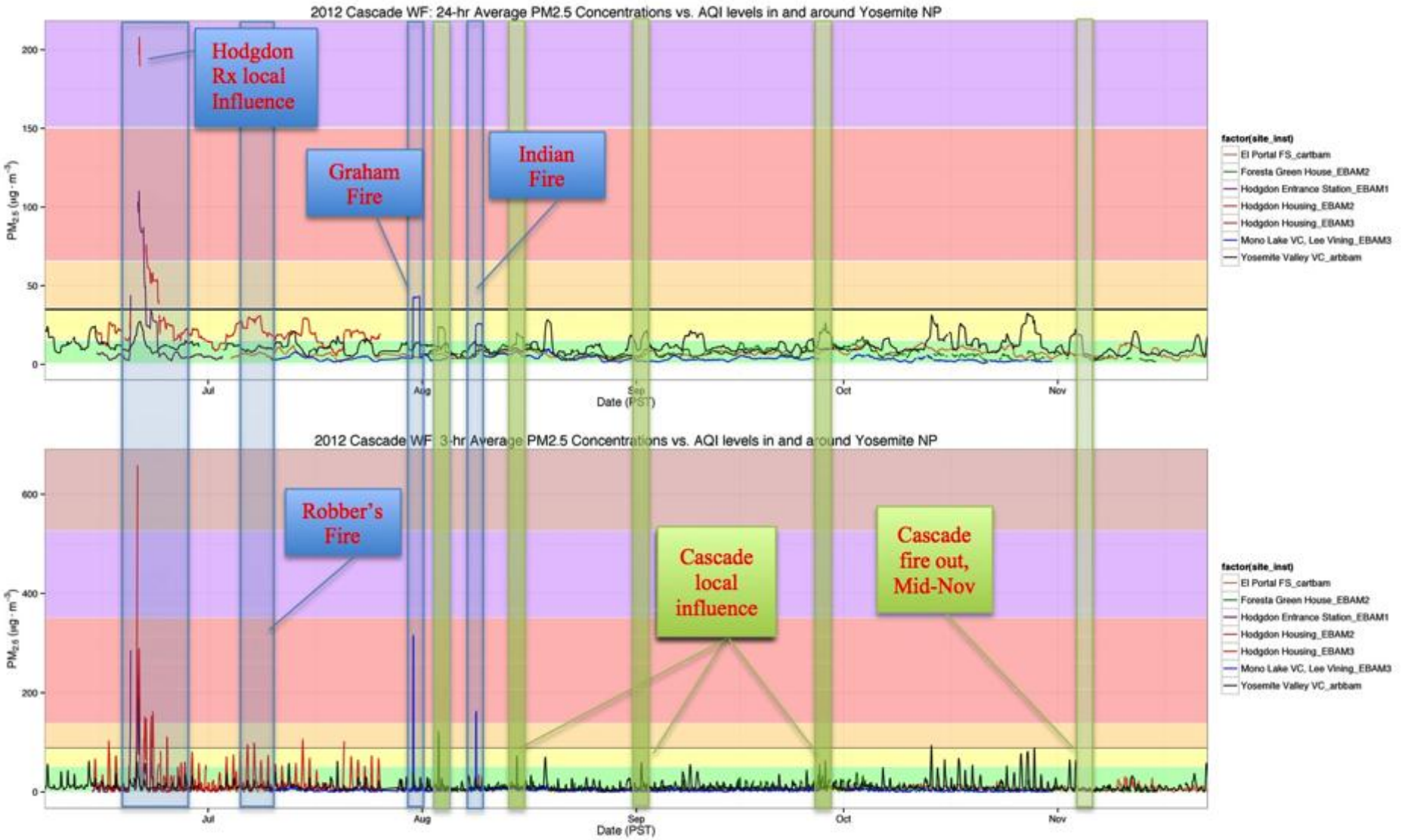

*See Guidelines for Public Health Officials: http://www.arb.ca.gov/carpa/toolkit/data-to-mes/wildfire-smoke-guide.pdf

Bivariate Pollutant/Wind Roses

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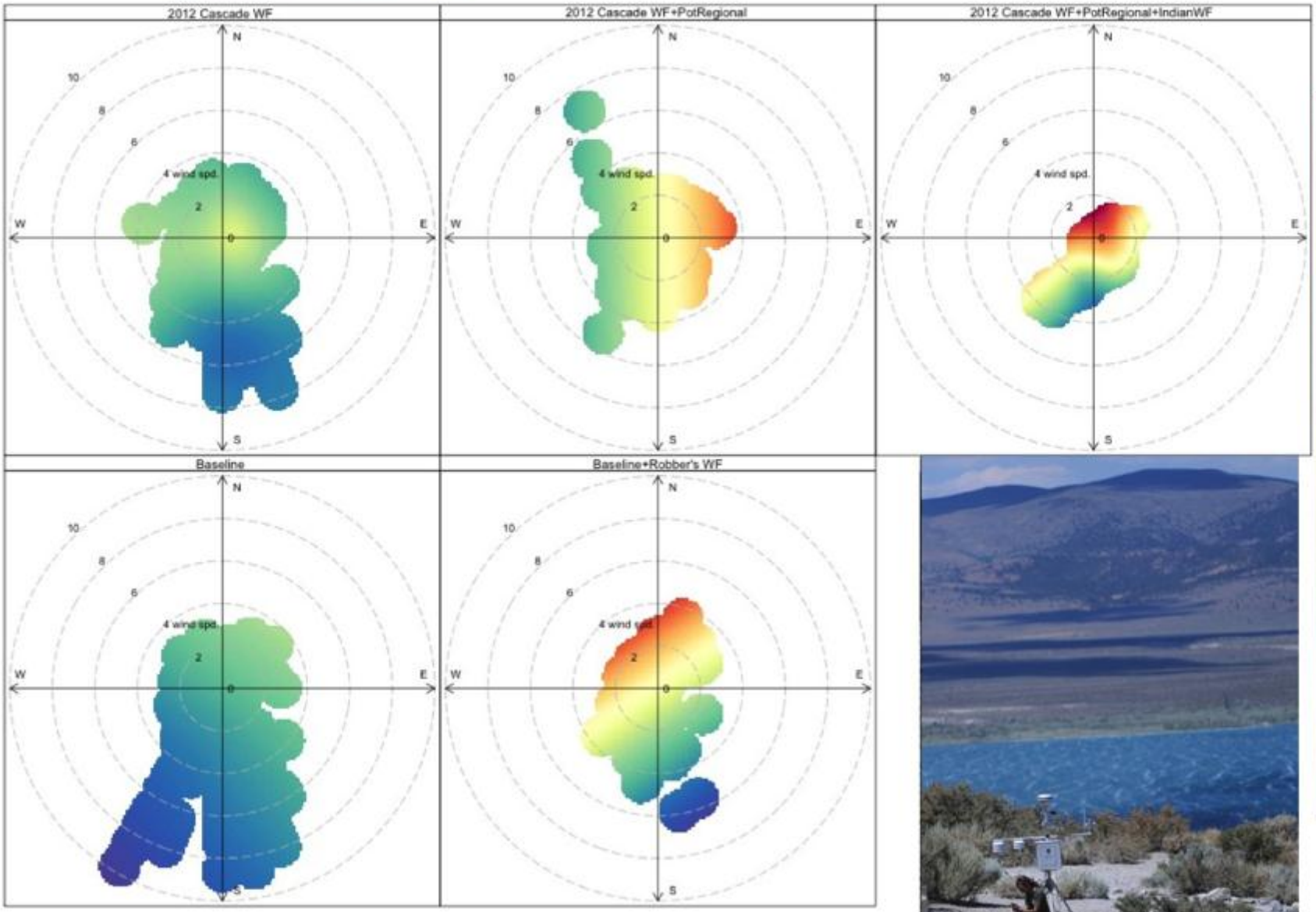
Mono Lake. See http://www.openair-project.org for more references and citations.



Climate Change and Opportunism

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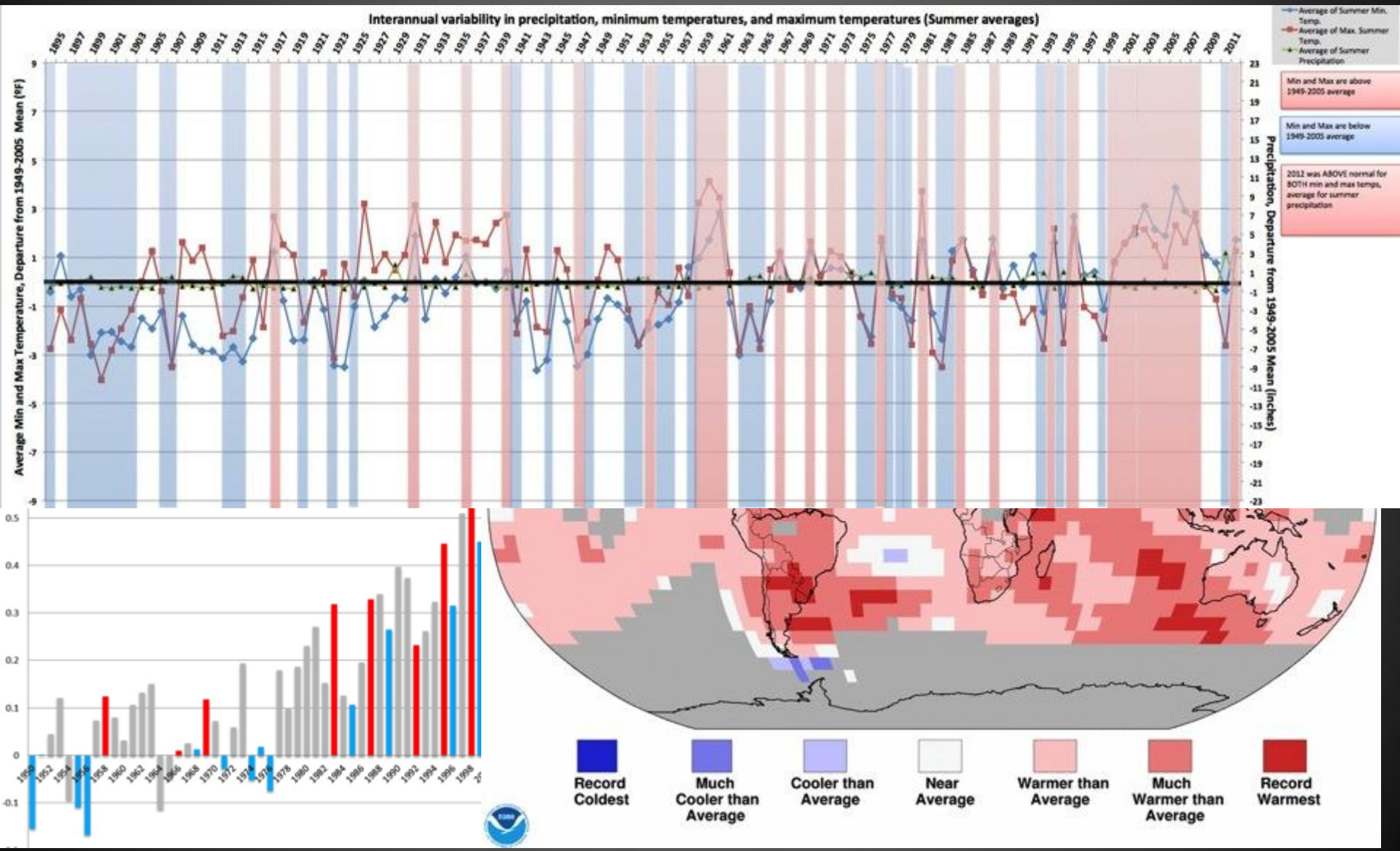

Conclusions

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National Park Service

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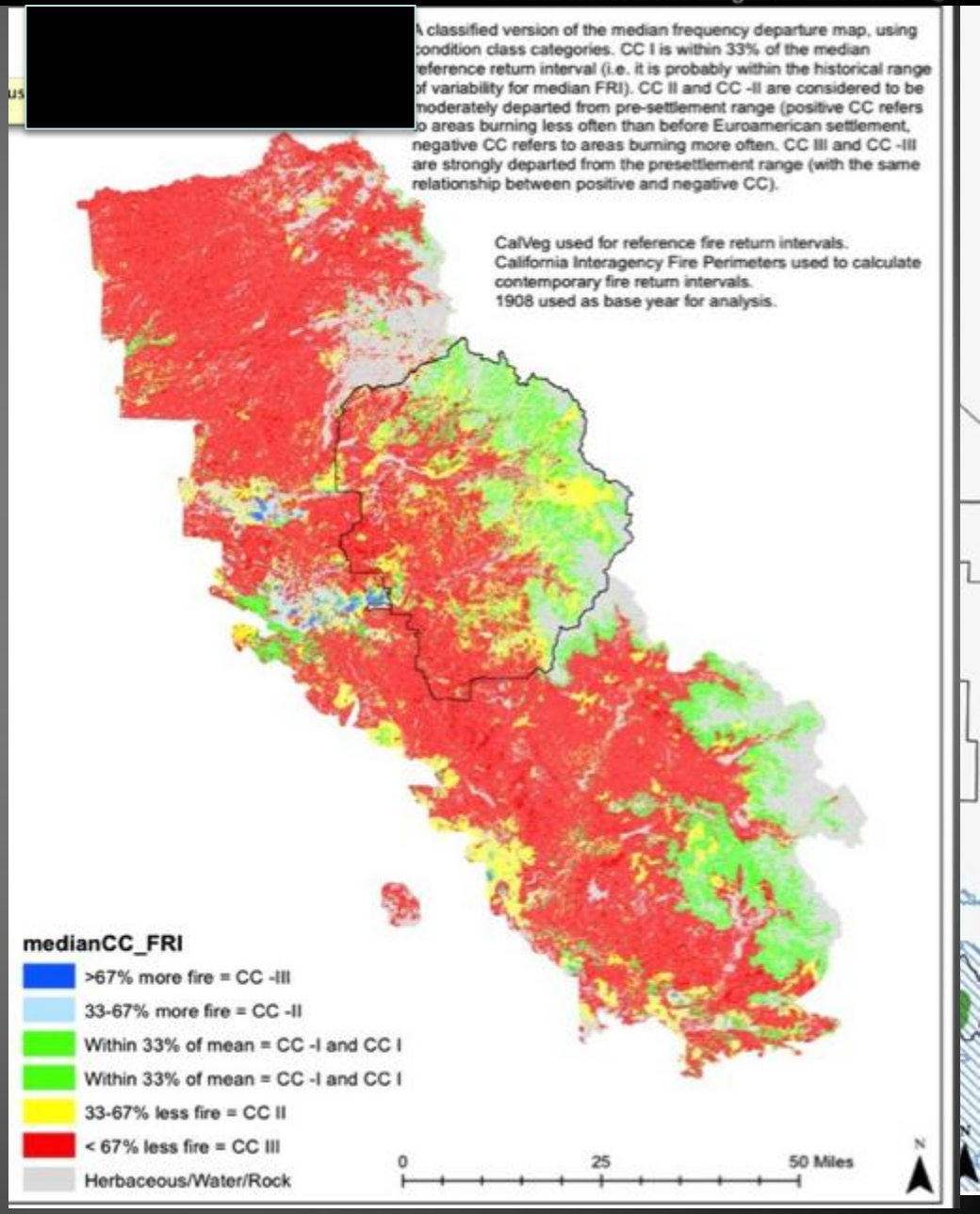
- There are high elevations sites like Cascade, even in hot/dry/smoky years
- Need to take advantage of cool years and shoulder/winter seasons to burn lower/slower in the mixed conifer (redder is worse).



Next Steps (Burn Day "Climatology")

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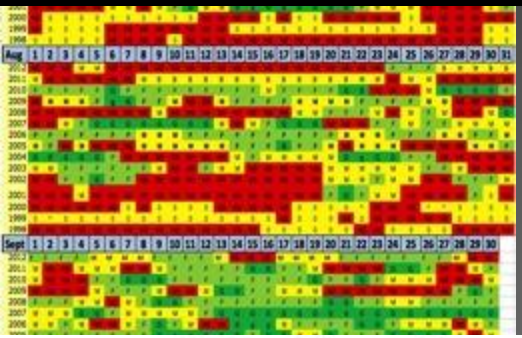

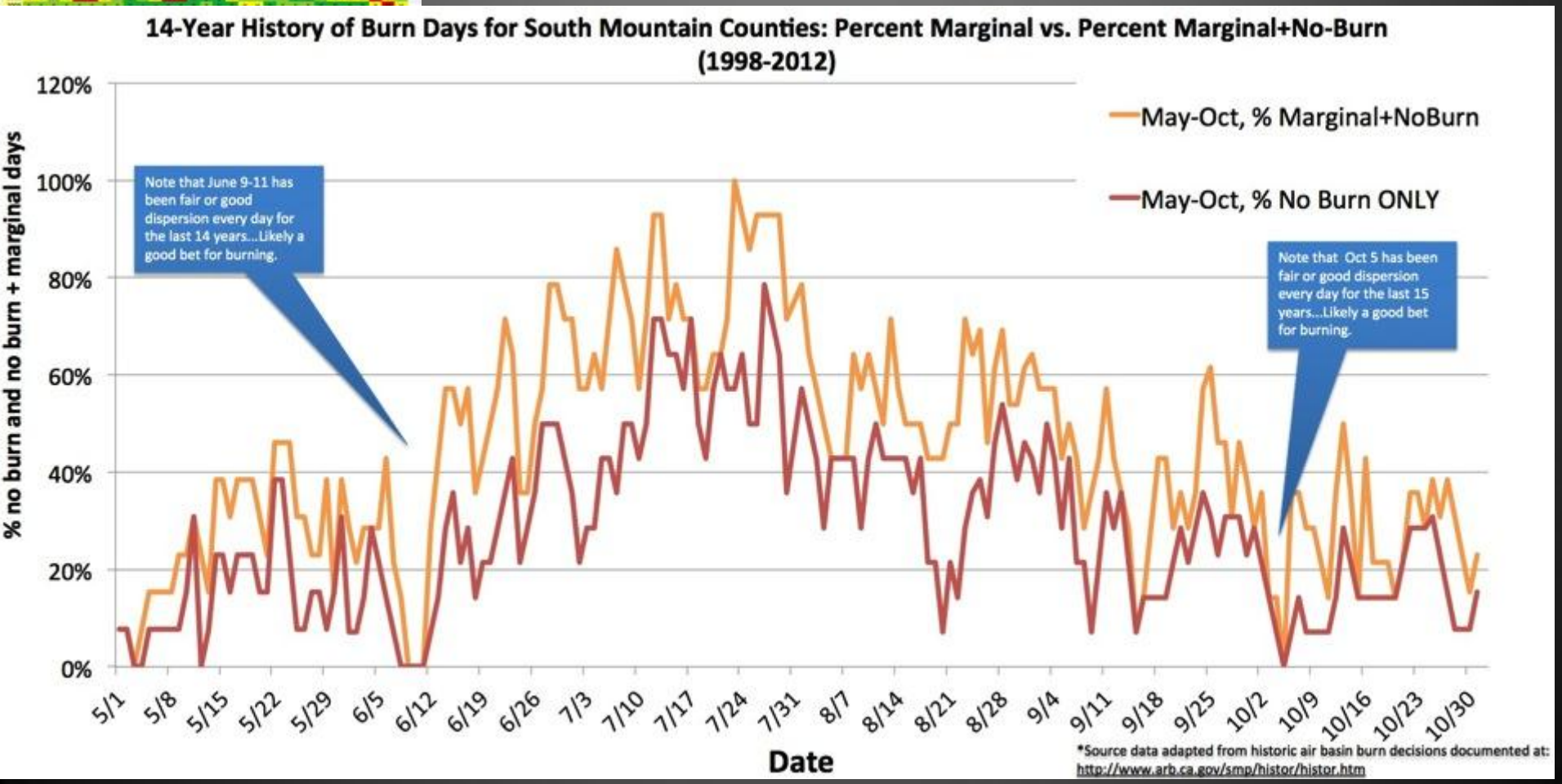

Next Steps: Realtime Monitoring Analysis

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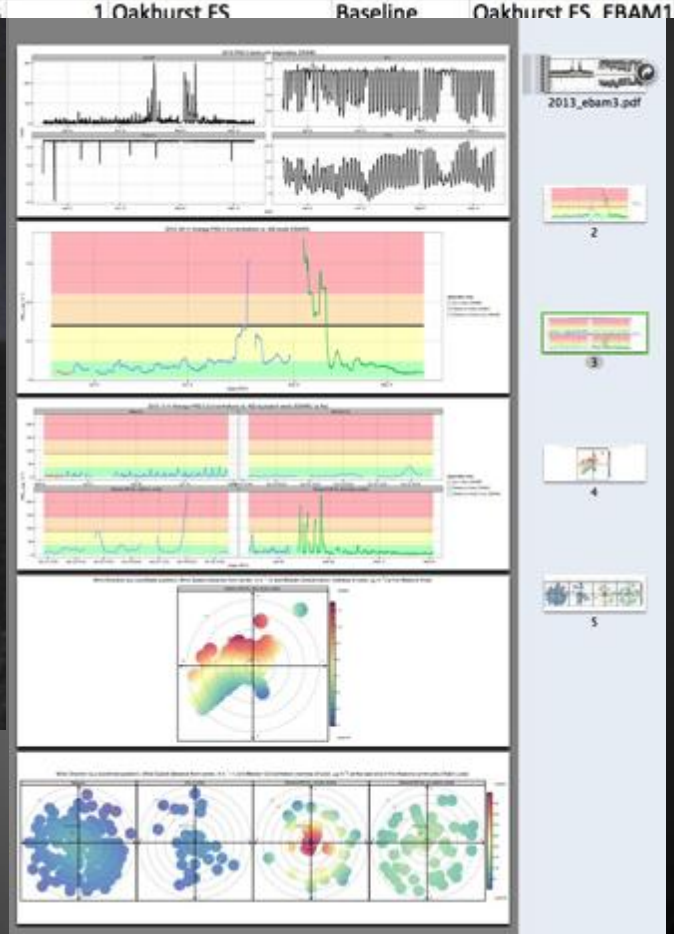
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	PST	Time	Inst	concQA	concHR	conc3HR	conc8HR	conc24HR	AT.C.	WS.m.s.	WD.Deg.	Site	Fire	site_inst
2	4/17/13 12:00	4/17/13 20:00	EBAM1	FlowLow	NA	NA	NA	NA	15.5	0.8	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
3	4/17/13 13:00	4/17/13 21:00	EBAM1	OK	5	NA	NA	NA	15.2	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
4	4/17/13 14:00	4/17/13 22:00	EBAM1	OK	5	NA	NA	NA	15.6	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
5	4/17/13 15:00	4/17/13 23:00	EBAM1	Negative	0	3.333333333	NA	NA	15.9	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
6	4/17/13 16:00	4/18/13 0:00	EBAM1	Negative	0	1.666666667	NA	NA	16.5	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
7	4/17/13 17:00	4/18/13 1:00	EBAM1	OK	6	2	NA	NA	16.5	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
8	4/17/13 18:00	4/18/13 2:00	EBAM1	Negative	0	2	2.666666667	NA	14.7	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
9	4/17/13 19:00	4/18/13 3:00	EBAM1	OK	8	4.666666667	3.428571429	NA	12.3	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
10	4/17/13 20:00	4/18/13 4:00	EBAM1	OK	0	2.666666667	3	NA	7.9	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
11	4/17/13 21:00	4/18/13 5:00	EBAM1	OK	6	4.666666667	3.125	NA	6.2	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1
12	4/17/13 22:00	4/18/13 6:00	EBAM1	OK	5	3.666666667	3.125	NA	5.2	0.3	1	Oakhurst FS	Baseline	Oakhurst FS_EBAM1

- Script tools:
  - Integrate metadata
  - Aggregate multiple sites
  - Visualize impacts
- Communicate
- Decide



Timelapse Tech

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National Park Service

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- 120 days
- 1 pic/minute
- 4 AA batteries
- 16 GB SD card
- USB connection

Brinno TLC200 Version 2.0 f1.2 Aperture Time Lapse and Stop Motion HD Video Camera with Built In Super Wide Angle Lens (140°) 120 Days Non Stop Shooting

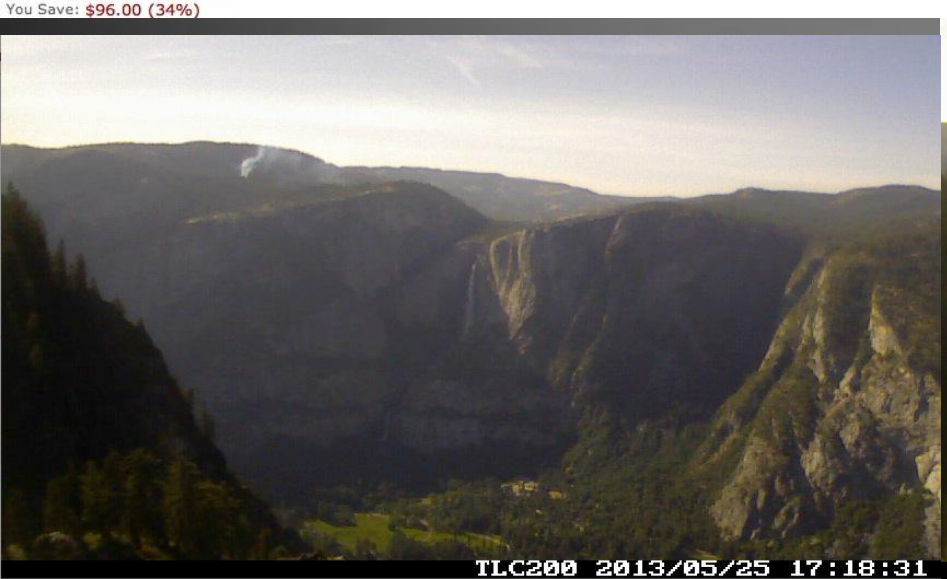
by Brinno

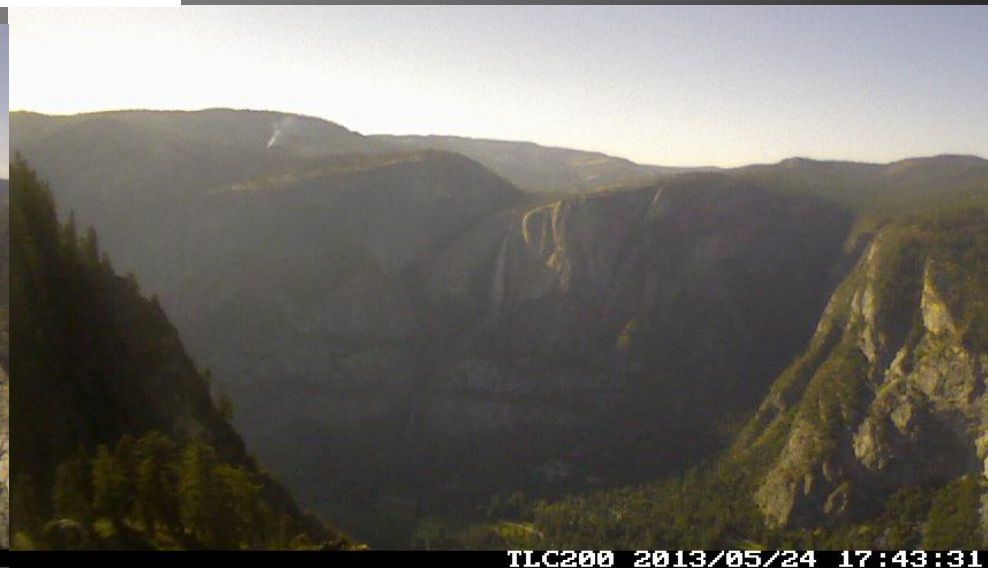
(10 customer reviews)

List Price: $285.95

Price: $189.95 Prime

You Save: $96.00 (34%)





Fire Probability Forecasts

U.S. Department of the Interior
National Park Service

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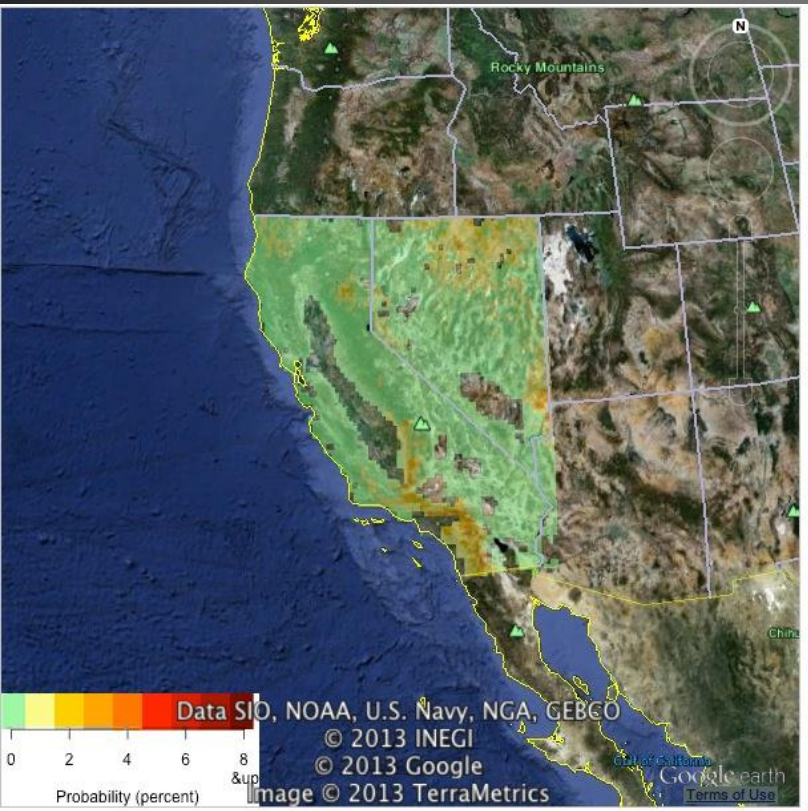
- http://manwe.ucmerced.edu/forecasts/fire_forecast_data/2013/forecasts.html



All Years

2012 2011 2010
2009 2008 2007 2006 2005 2004 2003 2002 2001 2000
1999 1998 1997 1996 1995 1994 1993 1992 1991 1990
1989 1988 1987 1986 1985 1984 1983 1982 1981 1980

2013 Season Forecasts:

- ☐ March (April 1) forecast for May 2013
- ☐ March (April 1) forecast for June 2013
- ☐ March (April 1) forecast for July 2013
- ☐ March (April 1) forecast for August 2013
- ☐ March (April 1) forecast for September 2013
- ☐ March (April 1) forecast for October 2013

- ☐ April (May 1) forecast for May 2013
- ☐ April (May 1) forecast for June 2013
- ☑ April (May 1) forecast for July 2013
- ☐ April (May 1) forecast for August 2013
- ☐ April (May 1) forecast for September 2013
- ☐ April (May 1) forecast for October 2013

- ☐ May (June 1) forecast for June 2013
- ☐ May (June 1) forecast for July 2013
- ☐ May (June 1) forecast for August 2013
- ☐ May (June 1) forecast for September 2013
- ☐ May (June 1) forecast for October 2013

- ☐ June (July 1) forecast for July 2013
- ☐ June (July 1) forecast for August 2013
- ☐ June (July 1) forecast for September 2013
- ☐ June (July 1) forecast for October 2013

- ☐ July (August 1) forecast for August 2013
- ☐ July (August 1) forecast for September 2013
- ☐ July (August 1) forecast for October 2013

- ☐ August (September 1) forecast for September 2013
- ☐ August (September 1) forecast for October 2013

- ☐ September (October 1) forecast for October 2013

2013 Season Forecast Odds:

- ☐ March (April 1) forecast odds for May 2013
- ☐ March (April 1) forecast odds for June 2013
- ☐ March (April 1) forecast odds for July 2013
- ☐ March (April 1) forecast odds for August 2013
- ☐ March (April 1) forecast odds for September 2013
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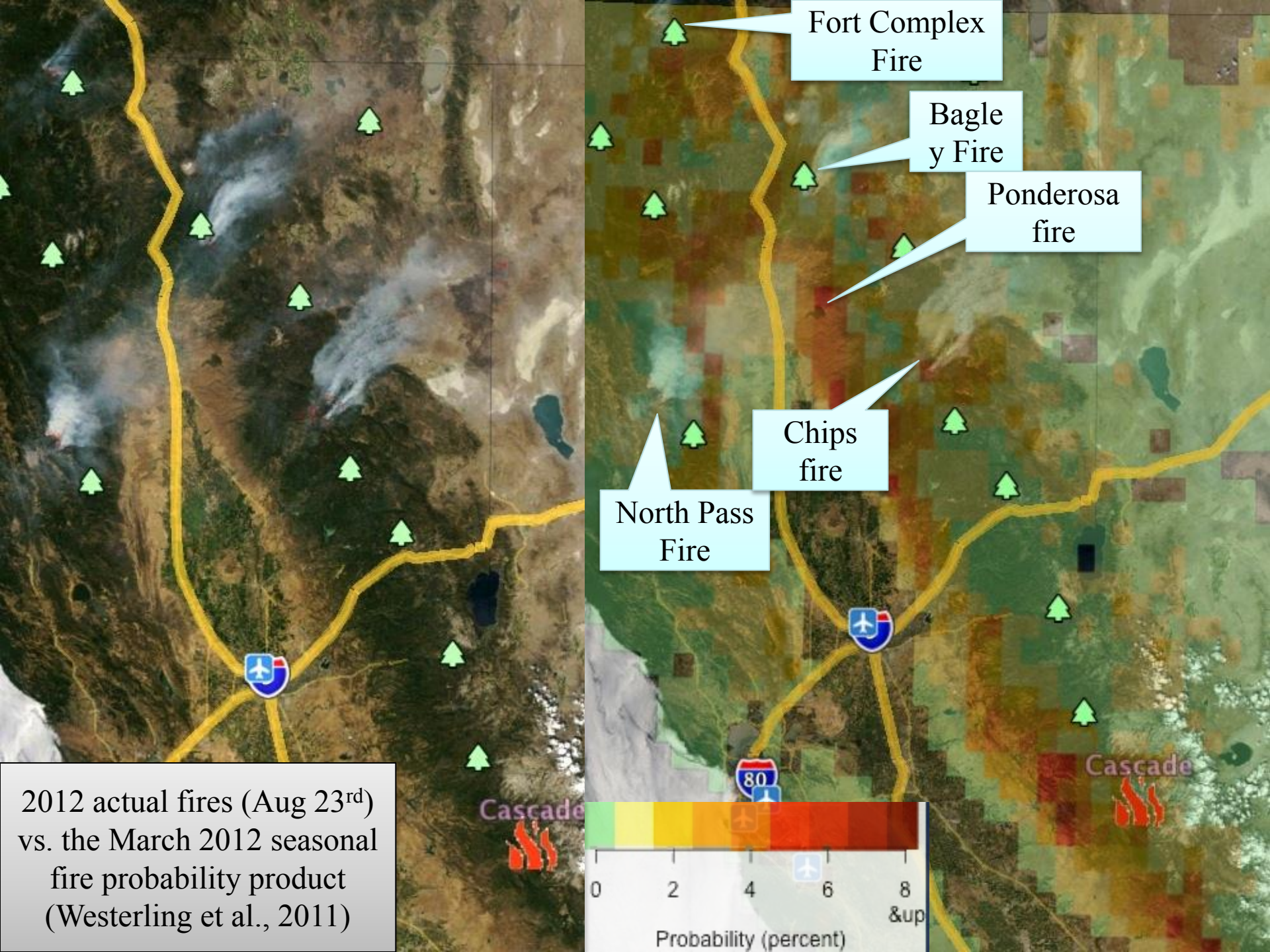
- ☐ August (September 1) forecast odds for October 2013

- ☐ September (October 1) forecast odds for October 2013



2012 actual fires (Aug 23rd) vs. the March 2012 seasonal fire probability product (Westerling et al., 2011)